I think that the authors have expanded their idea in one direction only, and I have not seen any reviews of their books applying this idea in the other direction. If, however, this application has been made, I shall be glad to be referred to the passages containing it. W. A. T. HALLOWES

New University Club, St. James's Street, S.W. January 4

Atmospheric Electricity

THE traces afforded by the self-registering electrometer at this observatory show that the conditions of the atmospheric electricity at Kew were very similar during the recent frosts to those observed at Montsouris by M. Descroix. We have, however, in the automatic instrument the great advantage of continuous registration, and therefore our information is not limited to the results afforded by seven observations daily.

The whole period of the frost was characterised by extremely high tension which with us averaged and frequently exceeded the amount which sufficed to derange the French instrument.

The absolute maximum tension recorded equalled 600 volts, and occurred about 4 P.M. on December 16.

The most noticeable feature in the curves of electrical disturbance during the period is that of the daily range of the instrument having attained a maximum usually between 8 to 10 P.M., the tension reaching over 400 volts at the time on the 17th, 18th, and 21st, and over 500 on the 22nd ult.

The fall in tension on the 25th was irregular and the value became almost zero at 6 A.M. on the 26th, for the whole of which day it continued low. Negative electricity was recorded for the first time from 1 to 3 A.M. on the 29th.

Undoubtedly the value of the tension of the atmospheric electricity, as measured by the Thomson electrometer is, as M. Descroix states, only a relative one. We have determined experimentally that with the same instrument the indicated tension is largely influenced by the distance of the nozzle of the water-dropping collector from the wall of the building in which the instrument is placed, and in accordance with a suggestion of Sir W. Thomson, we replace during the passage of thunderstorms our ordinary discharge-tube by a very short one, so as to get the scale of tensions within the range of the electrometer.

Kew Observatory, January 6 G. M. WHIPPLE

Electrical Phenomenon

I HAVE just read in NATURE (vol. xix. p. 182) an account of a strange electrical phenomenon observed at Teignmouth. In connection with it the following incident may be of some interest:—When in Switzerland, not long since, I made with some friends the ascent of Monte Rosa. The weather was unsettled, and on gaining the summit we saw a thunderstorm advancing in our direction from the Italian valleys, and not wishing to turn ourselves into lightning-conductors we deemed it wise to retire from the summit. We had retreated a very short distance along the *arête* when the storm-clouds swept up upon us; the fine snow fell so thick that we could hardly see one another, and we were all suddenly attracted by a peculiar ticking or fizzing from our hair; when I held up my axe the ticking was most distinctly heard from the top of it. The thunder ceased, and we felt that we were acting as points, through which the ground electricity was flowing off into the cloud; if it had been dark, the bluish light observed at Teignmouth might have been visible.

As at Teignmouth, so on Monte Rosa; it was freezing hard when the phenomenon was observed. W. S. GREEN

Alta Terrace, Monkstown, Cork

Time and Longitude

As the questions I propounded under this head in NATURE, vol. xviii. p. 40, have been again alluded to by Mr. E. L. Layard, I may remark that they receive a complete answer in the "Geographical Reader," by C. B. Clarke, M.A. (Macmillan and Co., 1876). At p. 19 he says: "At the town of Sitka, in Alaska, half the population are Russians who have arrived from Russia across Asia; half the population are Americans who have arrived *viâ* the United States. Hence, when it is Sunday with the Russians it is Saturday with the Americans; the Russians are busy on Monday while the Americans are in church on Sunday to the great interruption of business."

It is evident, then, that our new year first commenced in Alaska at 9 A.M. Greenwich time on December 31. Each of our days commences at the same hour and lasts forty-eight hours; the year exists for 366 days. LATIMER CLARK

January 4

Magnetic Storm of May 14, 15

THE magnetic storm of May 14, 15, which was observed simultaneously in England, China, and Australia, and which made itself felt in the telegraph wires of Persia and India, was also perfectly observed in America. Mr. G. F. Kingston, director of the government observatory at Toronto, Canada, has kindly forwarded to me a tracing of his magnetograms, and I find that all the principal inflexions of the declination, as well as of the components of the intensity, bear a striking resemblance to those recorded at the Stonyhurst observatory. The correspondence between the two vertical force curves on May 14 is very remarkable for such distant stations. Comparing the times of the principal minimas in the V.F. trace, and of the chief maximum of the declination, we have the following results in Toronto mean time:—

	Principal V.F. min.	Secondary V.F. min.	Decl. Max.
	P.M.	P.M.	P.M.
Toronto Observatory ...	6 17 ...	4 0 ...	6 39
Stonyhurst Observatory	6 42 ...	4 20 ...	6 54
	0 25 ...	0 20 ...	0 15

The disturbing force would thus appear to have been felt somewhat earlier in Canada than in Europe.

The extent of the extreme oscillation of the V.F. magnets cannot be compared, as that at Stonyhurst was too sensitive, and was consequently thrown off its balance; but the rapid movement of the declination needle immediately preceding the maximum was almost identical in England and in Canada, the Stonyhurst curves showing a rise of 28′ 39″ in less than twenty minutes, and that of Toronto an increase of 26′ 53″ in the same time.

It is important to note that I have used the terms maximum and minimum in reference to increase and decrease of ordinate, but it so happens that an increase of ordinate signifies a decrease of H.F. and V.F., and also of W. declination in the Toronto curves, whilst it shows an increase of all these elements in the magnetograms of Stonyhurst. S. J. PERRY

Stonyhurst Observatory, December 28, 1878

Blowpipe Experiment

I BEG to inform you of the following curious results which may be considered of sufficient interest to lead to further investigation of the subject.

Having received a quantity of blowpipe charcoal from Freiberg, about two months ago, I placed two sticks in a "stoneware" jar full of pure water in order to saturate them therewith, so that small squares cut with a saw and placed on aluminium plate as a support, might stand the blowpipe heat longer. I also found that thus treated there is little or no black sawdust, which dirties the hands, &c., more than anything else in blowpipe operations.

Having also placed in the same jar of water two "aluminium spoons" (thick rods about five inches long), I was surprised to find that after the charcoal had sunk to the bottom on saturation, the aluminium rods were covered with semi-opaque roundish *crystals* (part being perfectly transparent) near the surface of the water, and also at the very bottom where the spoons rested on the jar.

Thinking the crystals might be due (although I could not tell how with such a deliquescent substance) to some phosphoric acid I had previously fused upon the aluminium spoons, I cleaned them thoroughly and placed them in fresh pure water with the charcoal about a fortnight ago, and they are again covered with the same kind of crystals. I now carefully scraped the crystals off the aluminium rods with a penknife and placed them on an agate slab, where, when dry, they had a perfectly white, sugary appearance, with some minute transparent fragments. Taking up some of these opaque white fragments upon a hot bead of boric acid, I submitted them to the action of the blowpipe, and found—

(*a*) That they at first emitted a slight yellow pyrochrome, so that they could not be due to *potash*.

(*b*) The green pyrochrome of the boric acid was unaltered (no *soda*).

(*c*) The substance floated in the bead in bluish-white, fat-like, amorphous fragments like alumina or opaque silica as *tabasheer*, but—

(*d*) On continued heating, the fragments gradually disappeared, leaving bubbles, until in half an hour, with fresh boric acid, there was simply a transparent bead left; exactly the behaviour of minute fragments of diamond in boric acid.

Silica is absolutely, and alumina nearly, insoluble in boric acid before the blowpipe.

One conclusion, therefore, seems this: that a slow solution of charcoal in the water takes place, and that crystals of carbon are deposited upon the aluminium.

London, December, 1878 W. A. Ross

Observations on the Microphone

With regard to an explanation of the action of the microphone I observed a fact which, though it was already known from some anterior experiments with strong galvanic currents, has not been remarked, as far as I know, with this instrument. On connecting the current from six Grove cells with the microphone (the telephone not being in the circuit) composed of the three carbon rods, the vertical one assumes a vibratory motion between its supports, which causes a very audible sound, especially when placed on a sounding-board.

I think this experiment may serve as another illustration of the well-known fact, discovered by Ampère, of the repulsive action between the subsequent parts of a rectilinear current. Most of the experimental proofs bearing on this point leave some doubt as to a true demonstration, because a dilatation from the heating effect of the very strong currents used with metallic bodies may interfere, and are considered, for example, to explain the experiments of Forbes and Gore.[1] But in my case, with a substance which has a very small coefficient of dilatation, I think the vibratory motion may be considered as an electrodynamic effect. As a supporting demonstration, I suspended with insulated metallic wires near another, three horizontal pieces of carbon (3 cm. long) in such a way that they could move freely away, and the two outer ones were connected with a battery of twenty Grove cells; *immediately* on closing the circuit a repulsion ensued between them and an oscillating motion set in, whilst bright sparks appeared between the contacts.

This experiment may throw some light on a recent controversy which has arisen between Mr. Varley and Prof. Hughes.[2] The latter insists on a change in contact resulting from alternating varying forms of the molecules or their spheres of action, in accordance with the sonorous vibrations. Mr. Varley points out a quite distinct cause. By using a contact-breaker moved with the hand he discovered, on applying a microscope with a 350 times magnifying power when the circuit was closed or opened, a grey cloud issuing between the nearest carbon-points. This seems to prove that little particles of carbon are loosened by an effect of trituration on the contact-surface, the cohesion being lessened by the heating effect of the current. This cloud of microscopic dust serves as a vehicle to the current (when the carbon piece is vibrating), and its resistance of course is easily modified by the impinging sound-vibrations. Now my experiment, though with a strong current, supports this fact, and shows that the vertical carbon is actually vibrating under its influence, and may prepare the above-mentioned condition, or at least render it very ready to change its contact in accordance with sound-waves acting on it with more or less force.

Perhaps it will be observed that a microphone acts very well in transmitting sound when even the weak current from a couple of Leclanché cells is used, but then, also, we may admit a propensity (through the influence of this current) of the vertical carbon rod to get into a vibratory condition, which the sonorous vibrations will easily actuate according to their own period, if really it is not already vibrating at microscopical distances.

Prof. Hughes alludes to an experiment which, as he thinks, gives an evident support to his theory. In a sealed glass tube are inclosed five loose pieces of carbon with terminals to admit a current. He remarks that, properly pressed mere mechanical shaking produces no variation of the current except that due to a constantly increasing resistance caused by abrasion of the carbon contacts, whilst under the influence of sonorous vibrations a varying current is produced, because the tube in this case is varying its length, and the molecules undergo proportional change of form. I think this proof may be as well, and with more probability explained by the facts mentioned above. The tube contains four or five *loose* pieces of carbon, and besides these some air, which, as it is in a closed space, will press from all sides on the carbon parcels when it is put in vibration by sound, and therefore alter in a mechanical way their distances, the more because the surfaces in contact are rough ones. In conclusion I will observe that the audible vibration of the vertical carbon rod in the microphone certainly elucidates the facts discovered by Blyth concerning sound transmitted only with coal cinders forming a receiving and a transmitting apparatus in a galvanic circuit, and on which he insists in a recent communication to this journal (Nature, vol. xix. p. 72). L. Bleekrode

The Hague, December 8, 1878

[1] Forbes, *Phil. Mag.*, t. xvii. p. 358. Gore, *ibid.*, t. xv. p. 519.

[2] *Telegraphic Journal*, October 1 and 15, 1878.

Shakespeare's Colour-Names

In the name of scientific accuracy and fair criticism I protest against Mr. Murphy's letter in Nature, vol. xix. p. 197. His remarks proceed on the perfectly gratuitous assumption that *all* eagles have blue eyes. As this is not a fact (the only live ones I have examined had both of them green eyes), I have no hesitation in asserting that when Shakespeare wrote "An eagle, madam, hath not so green, so quick, so fine an eye as Paris hath," he did so, after having seen an eagle or eagles, and that when he said green he "evidently" meant green, and not blue.

Edinburgh, January 4 A. Craig-Christie

Your correspondent, Mr. J. J. Murphy, in his letter, Nature, vol. xix. p. 197, overlooks the fact that *blue* is quite as inappropriate as *green* to describe the eye of an eagle. Shakespeare would never have used either epithet; the word he made use of was doubtless *keen*. Green has been substituted by the mistake of some transcriber of the play working by ear, and not by eye. I only wonder the correction has not been made long ago by some commentator. Robert Brewin

Exeter, January 4

The Meteor Shower of January 2

After a very heavy fall of rain, sleet, and then snow (equalling in the aggregate 1·472 inch), on the evening and night of January 1, the clouds partly cleared away on the ensuing morning, and during a watch of twenty minutes (6·14 to 6·34 A.M., January 2) in a sky fully two-thirds overcast, fourteen meteors were seen, all of them belonging to the special shower in Quadrans. This radiant was evidently very active at the time I saw it, and in a cloudless sky, must have supplied meteors at the rate of more than one per minute (for one observer). The paths were short and quick without streaks or trains. Radiant point at 230° + 51°, but not very exactly found owing to the clouds and haze through which several of the meteors were indistinctly seen. Three or four were as bright as 1st mag. stars. W. F. Denning

Ashleydown, Bristol, January 2

OUR ASTRONOMICAL COLUMN

Missing Nebulæ.—In Mr. Ellery's Report, to which reference was made last week, it is stated that "two nebulæ, H 4223 and H 1561, widely separated from each other, and described by Herschel as prominent objects, cannot now be found, although careful search has been made for them." The first of these nebulæ is near the cluster Dunlop 413: in the "General Catalogue" it is called "a remarkable object," but being very large and faint, it might, perhaps, be suspected that its invisibility in the Melbourne reflector is owing to the same cause that has led to the Pleiades-nebula, and other similar diffused objects (as G. C. 132, 4570, 5051) being overlooked in very large telescopes though obvious in much smaller ones. But in the case of H 1561 no such supposition is admissible. It was observed by Sir John Herschel on five occasions, in sweeps made between December, 1834, and February, 1836; when best seen it was termed pretty bright, from 25″ to 35″ in diameter, gradually brighter towards the centre, and situate to the south of, though very near to, three stars of the eleventh